

FINAL

SAN FRANCISCO BAY AREA

NON-ATTAINMENT AREA AND RATE-OF-PROGRESS
PLAN
(ATTAINMENT PLAN)

FOR THE NATIONAL OZONE STANDARD

ADOPTED

SEPTEMBER 1993

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Mailing Address:
Planning Division
BAAQMD
939 Ellis Street
San Francisco, CA
94109
Fax
(415) 928-8560



Association of
Bay Area
Governments
510/464-7900



Bay Area
Air Quality
Management District
415/771-6000

MTC
METROPOLITAN
TRANSPORTATION
COMMISSION

Metropolitan
Transportation
Commission
510/464-7700

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ABBREVIATIONS AND TERMINOLOGY

AIRS	Air Information Retrieval System	NAAQS	National Ambient Air Quality Standards
ABAG	Association of Bay Area Govenernements (California)	NAMS	National Ambient Air Monitoring Stations
ARB	Air Resources Board	NMOC	Non-Methane Organic Compounds
APCO	Air Pollution Control Officer	NO _x	Oxides of nitrogen
AQP	(1982 Bay Area) Air Quality Plan	NO ₂	Nitrogen dioxide
BAAQMD	Bay Area Air Quality Management District	NPRM	Notice of Proposed Rule Making
BAR	Bureau of Automotive Repair	NSR	New Source Review
BART	Bay Area Rapid Transit	O ₃	Ozone
CAA	(Federal) Clean Air Act	PC-BEIS	Personal Computer - Biogenic Inventory System
CAAA	(Federal) Clean Air Act Ammendments	PM ₁₀	Particulate Matter Less Than 10 Microns
CAP	(Bay Area 1991) Clean Air Plan	pphm	Parts per hundred million
CEQA	California Environmental Quality Act	ppm	Parts per million
CFR	Code of Federal Regulations	PST	Pacific Standard Time
CO	Carbon monoxide	RACT	Reasonably Available Control Technology
DOT	Department of Transportation	RFP	Reasonable Further Progress
EIR	Environmental Impact Report	ROG	Reactive organic gases
EITAC	Emission Inventory Technical Advisory Committee	RTP	Regional Transportation Plan
EKMA	Empirical Kinetic Modeling Approach	RVP	Reid Vapor Pressure
EPA	Environmental Protection Agency	SIP	State Implementation Plan
ETC	Employer Transportation Coordinator	SLAMS	State and Local Air Monitoring Stations
FHWA	Federal Highway Administration	TCMs	Transportation control measures
FIP	Federal Implementation Plan	TIP	Transportation Improvement Program
FMVCP	Federal Motor Vehicle Control Program	TPD	Tons per day
FTA	Federal Transit Administration	TRO	Trip Reduction Ordinance
HC	Hydrocarbons	TSM	Transportation Systems Management
HOV	High Occupancy Vehicle	UAM	Urban Airshed Model
HPMS	Highway Performance Monitoring System	VMT	Vehicle miles travelled
I & M	Motor Vehicle Inspection and Maintenance (Program)	VOC	Volatile organic compounds
LDT	Light-duty trucks	WOCSS	Winds On Critical Streamline Surfaces
MTC	Metropolitan Transportation Commission		

SECTION 1: INTRODUCTION

This Nonattainment Area and Rate-of-Progress Plan (herein the "Attainment Plan") addresses the ambient air quality standard for ozone set by the U.S. Environmental Protection Agency (EPA), under the provisions of the federal Clean Air Act of 1970 and subsequent amendments. The Attainment Plan documents a course of action for attainment of the national ambient air quality standard for ozone in the San Francisco Bay Area.

Ozone in the lower atmosphere is an air pollutant which is harmful to humans because it causes respiratory problems. Ozone also harms vegetation, reduces crop yields, and accelerates deterioration of paints, finishes, rubber products, plastics, and fabrics. The EPA has set primary National Ambient Air Quality Standards (NAAQS) for ozone and other¹ air pollutants to define the levels considered safe for human health. The NAAQS for ozone is set at 0.12 parts per million (ppm) for a one-hour averaging time. EPA procedures for determining attainment of the standard require representative air quality measurements showing three years of clean air, with no more than one exceedance of the standard per year, on average, at any air monitoring site.

The Bay Area Air Quality Management District (BAAQMD or District) was established in 1955 by the California Legislature to control air pollution in the

counties around San Francisco Bay². The BAAQMD has measured ozone levels for many years and now has 23 monitoring sites with certified instruments measuring ozone. Because past ozone measurements showed violations of the national standard, the Bay Area was designated by EPA as a non-attainment area, and was subject to various planning and air pollution control requirements.

Many federal, State and regional control programs have been implemented over the years to reduce ozone levels. BAAQMD air monitoring records for the past three years (1990, 1991 and 1992) show ozone levels low enough to qualify the region for attainment status with respect to the national standard.³ A separate document known as the Maintenance Plan has been prepared that follows a formal procedure by which the Bay Area regional planning agencies⁴ request redesignation to attainment status and demonstrate that ozone will not increase to a level above the national standard in the future. This Attainment Plan is written to comply with federal requirements that remain in force until such time as the Bay Area is formally redesignated to "Attainment" status.

This Attainment Plan was adopted by the three regional agencies and submitted to the California Air Resources Board (ARB) for subsequent transmittal to EPA by November 15, 1993.

Because the San Francisco Bay Area has not yet been redesignated to attainment status for the national ozone standard, the 1990 Clean Air Act Amendments require that the three regional agencies prepare a Nonattainment Area and Rate-of-Progress Plan (Attainment Plan). If the EPA approves the Maintenance Plan (a separate document), this Attainment Plan will be withdrawn.

- 1 Carbon monoxide, particulate matter, sulfur dioxide, nitrogen dioxide and lead are other pollutants for which NAAQS have been established.
- 2 Counties in the San Francisco Bay Area Air Basin include all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo and Santa Clara counties, and the western part of Solano and the southern part of Sonoma counties.
- 3 California's standard for ozone is 0.09 parts per million, for a one-hour average. There is a separate State air quality planning process set forth in the 1988 California Clean Air Act and subsequent amendments.
- 4 The regional planning agencies (the BAAQMD, the Association of Bay Area Governments and the Metropolitan Transportation Commission) have been designated co-lead agencies for federal air quality planning in the San Francisco Bay Area.

Current Ozone Air Quality in the Bay Area

The National Ambient Air Quality Standard (NAAQS) for Ozone

The harmful effects of air pollution have been recognized for many years, but scientific studies and legal procedures have been developed only in recent decades to define specific pollutants. Ozone is the principal component of photochemical smog. It was first recognized and studied by Haagen-Smit in Southern California in the early 1950s. Beginning in 1969, the State of California set a photochemical oxidant standard, and in 1971 the EPA set National Ambient Air Quality Standards for several air pollutants, including photochemical oxidants. In 1979, EPA changed the photochemical oxidant standard to an ozone standard. The current national standard, the subject of this Plan⁵, is 0.12 parts per million of ozone in ambient air, based on a one-hour averaging time for the measurement. This is usually shortened to 0.12 parts per million, or simply 0.12 ppm.

There are both primary and secondary air quality standards. Primary standards are set to protect human health, with a margin of safety to protect the more sensitive persons in the population such as the very young, the elderly, and the ill. Secondary standards are set to protect property, materials, aesthetic values and general welfare. Primary and secondary standards for a pollutant may be set at the same or different levels. For ozone, the national primary and secondary standards are identical. The numerical levels of the standards are subject to change, based on new scientific evidence (or new interpretation of existing evidence) and are summarized in air quality criteria documents. The criteria and the standards are periodically reviewed, but changes are infrequent. The national primary and secondary standard for ozone has been set at 0.12 ppm since 1979.

Ozone is a reactive chemical compound--a molecule consisting of three oxygen atoms with chemical symbol O₃. Ozone is a strong oxidizing agent with a potential to damage living or inanimate things with which it comes in contact. When present in the lower atmosphere⁶, even at low concentrations, ozone is harmful to human health and to property. Ozone

damages trees and other natural vegetation, reduces agricultural productivity, and causes or accelerates deterioration of building materials, surface coatings, rubber, plastic products and textiles. The most common human health effects are breathing impairment. These are thought to be reversible acute effects, but there is some emerging evidence of chronic effects from long-term exposure.

Recent Ozone Monitoring Trends

Table 1 presents information on daily maximum ozone concentrations in the Bay Area for 1990, 1991 and 1992. Shown for each monitoring site are the numbers of days exceeding the national ozone standard and maximum and second highest hourly ozone values. From 1990 through 1992, no District monitor registered more than two exceedances of the national ozone standard. The national standard allows up to three expected⁷ exceedances at any one site over a three-year period (i.e., less than or equal to an average of one exceedance per year). Because of a forced relocation, the new Alum Rock site did not have a complete three years of monitoring data to determine the number of exceedances. Based on the monitoring data, and the calculated number of expected exceedances at the Alum Rock monitoring station, the BAAQMD contends it has met the national ozone standard. Supporting evidence for this claim is provided in the Maintenance Plan. More detail on the air monitoring data is provided in Appendix A, "Air Monitoring Data."

In 1990, there were two days when one or more monitoring stations exceeded the national standard. In 1991, there were two days when one or more monitoring stations exceeded the national standard. In 1992, there was the same number of federal exceedances as was recorded in 1991. In the "attainment" years (1990, 1991 and 1992), no single monitor had three or more exceedances of the national ozone standard.

The two locations where exceedances of the national standard were last recorded are of particular interest in terms of their geographic distribution, and the

5 The current California standard for ozone is 0.09 ppm, based on the State's independent interpretation of medical and scientific evidence. The BAAQMD has prepared and adopted the 1991 *Clean Air Plan* to reduce ozone levels and maintain progress toward attainment of the more stringent State standard. That effort is independent of this Attainment Plan for the national ozone standard.

6 This Plan addresses ozone in the lower atmosphere, near the ground, where people breathe and where ozone affects plants and property. A separate layer of ozone in the stratosphere, miles above the earth's surface, absorbs ultraviolet radiation and is generally thought to be beneficial to human health and welfare. Stratospheric ozone will not be affected by this Plan.

7 The statistical term "expected" is used to allow for computational corrections in the monitoring data arising from missing values or incomplete sampling.

TABLE 1
San Francisco Bay Area
State and Local Air Monitoring Stations
(SLAMS) Ambient Ozone Measurements
Exceedances of the National Standard and Peak Hourly Concentrations
1990-1992

Site	Number of Exceedances of the National Ozone Standard				Peak Daily High Ozone (ppm**)	
	1990	1991	1992	1990-92	Maximum	SecondHigh
North Counties						
Santa Rosa	0	0	0	0	0.09	0.08
Sonoma	0	0	0	0	0.10	0.10
Napa	0	0	0	0	0.11	0.11
Vallejo	0	0	0	0	0.11	0.11
Fairfield	0	0	0	0	0.10	0.10
Central Bay						
San Francisco	0	0	0	0	0.08	0.06
San Rafael	0	0	0	0	0.08	0.07
Richmond	0	0	0	0	0.08	0.06
Oakland	0	0	0	0	0.08	0.07
San Leandro	0	0	0	0	0.12	0.11
Peninsula						
Redwood City	0	0	0	0	0.09	0.08
Mountain View	0	0	0	0	0.12	0.11
East Contra Costa						
Concord	0	0	0	0	0.11	0.11
Pittsburg	0	0	0	0	0.11	0.11
Bethel Island	0	0	0	0	0.12	0.12
So. Alameda County						
Fremont	1	0	0	1	0.13	0.12
Hayward	0	0	1	1	0.13	0.10
Livermore	1	1	0	2	0.14	0.13
Santa Clara Valley						
San Jose-4th Street	0	0	0	0	0.12	0.12
San Jose-San Carlos Street	1	0	0	1	0.13	0.11
Los Gatos	0	0	1	1	0.12	0.12
Alum Rock (old)	0	-	-	0	0.11	0.09
Alum Rock(new)	(1*)	0*	1	2	0.13	0.11
Gilroy	0	1	0	1	0.13	0.12

* For the new Alum Rock site, number of exceedances for 1990 and 1991 are estimated. Maximum and second high are the peak values observed in 1992.

** Value must exceed 0.12 ppm to be considered an exceedance of the national ozone standard.

format of the national standard, which defines attainment statistically as no more than three days exceeding the standard in the most recent three-year period at any single station. By this EPA definition, the

District in 1992 had attained the national ozone standard. Livermore, the last station to exceed this standard, had an expected annual exceedance of 0.67, which is less than one day per year.

Non-Attainment Designation - National Ozone Standard

Current Formal Designation Status

The Bay Area is currently designated non-attainment for the national ozone standard. A non-attainment area is defined as an area that does not meet the National Ambient Air Quality Standards for a specific pollutant.

There are five federal classifications for areas which are non-attainment:

- **Marginal** (areas with the lowest unhealthy ozone concentrations)
- **Moderate** (the Bay Area)
- **Serious**
- **Severe**
- **Extreme** (the area with the highest ozone concentration, Los Angeles)

These classifications are based on an area's "design value." The Bay Area's ozone design value used for classification purposes is 0.14 ppm, qualifying the region as a moderate non-attainment area. As a moderate area, the Bay Area is required under the 1990 CAAA to attain the national ozone standard as expeditiously as practicable, but by no later than November 15, 1996.

Redesignation Request in Progress

The BAAQMD has prepared a Redesignation Request and Maintenance Plan (Maintenance Plan). The Maintenance Plan shows, based on air monitoring data for the Bay Area, that the national ozone standard has been attained. If the EPA concurs with the BAAQMD that the Bay Area has attained the standard, the Maintenance Plan will be implemented to provide for continued attainment of the standard.

This Non-Attainment Area / Rate-of-Progress Plan would then be withdrawn.

To show attainment of the national ozone standard, no monitor can have more than three days with exceedances of 0.12 ppm during the three most recent calendar years. Air quality measurements in the Bay Area satisfy these requirements. Data supporting the BAAQMD's showing of attainment is illustrated in Table 1.

This Attainment Plan is to be submitted to ARB and to EPA before the November 15, 1993 deadline to assure that the Bay Area will have in place a *working* SIP, as required under the CAA. For the Bay Area, the preparation of the Maintenance Plan, which can be prepared and submitted to EPA at any time, turned out to be concurrent with the Attainment Plan schedule. EPA approval of the Maintenance Plan would exempt the region from the non-attainment area planning requirements and would result in withdrawal of the Attainment Plan. However, in the event that the EPA disapproves the Maintenance Plan (or the region experiences new violations of the ozone standard), the Attainment Plan would be adopted and submitted on schedule.

If the co-lead agencies for air quality planning in the Bay Area were to rely solely on EPA's approval of the Maintenance Plan, and the plan were to be disapproved, the EPA would not have discretion to adjust schedules to allow for the preparation and submittal of the Attainment Plan after the November 15, 1993 deadline. Failure to meet SIP submittal deadlines could put the Bay Area at risk of federal sanctions and/or preparation of a Federal Implementation Plan (FIP) by EPA.

Plan Approval Process

Prior to the Attainment Plan becoming a formal revision to the State Implementation Plan (SIP), the Plan will be subject to an approval process involving the three regional agencies (ABAG, BAAQMD and MTC), the ARB and the EPA. After formal adoption of this Plan by the three co-lead agencies for air quality planning, it will be submitted to ARB. After state review, the Plan will be forwarded to EPA, Region IX. The following sections describe the role ARB and EPA play in the Plan approval process.

California Air Resources Board (ARB) Review

The CAA specifies that the State submit for moderate ozone non-attainment areas a revision to the applicable SIP by no later than November 15, 1993 (Section 182(b)(1)(A)). The ARB is the State-mandated authority for submission of SIP revisions. Therefore, upon completion of the Attainment Plan by the three regional co-lead agencies, the Attainment Plan will be forwarded to the ARB for review,

with subsequent transmittal to the EPA. The regional agencies intend to adopt and transmit this Plan to ARB no later than September 30, 1993, to allow adequate time for ARB review and approval. The ARB, acting for the State, has primary responsibility for assuring air quality within the State and therefore must approve the Attainment Plan prior to submission to the EPA.

U.S. Environmental Protection Agency (EPA) Review

Upon receipt of the Attainment Plan from the ARB, the EPA will conduct its review of the Attainment Plan. The first step in this approval process is the "completeness" review. The minimum criteria for

determining the completeness of the Attainment Plan is contained in 40 CFR Part 51, Appendix V. This appendix addresses the administrative and technical support requirements of the submission. The EPA is required to make a completeness finding no later than six months after receipt of the Plan or the Plan will be deemed complete automatically. Twelve months after the Plan has been determined to be complete, the EPA must approve, partially approve, or disapprove the Plan. Upon approval of the Attainment Plan by the EPA, the EPA will give notice in the *Federal Register* of approval, and if warranted, provide any conditions associated with approval. After approval of the Attainment Plan, regulatory activities conducted by the State and the District would be required to conform with the revised SIP.

Redesignation Request -- Maintenance Plan

Submittal of a Redesignation Request and Maintenance Plan is not required. Bay Area planners have chosen to prepare and submit a Redesignation Request and Maintenance Plan (Maintenance Plan) in order to: (1) formally recognize the progress to date in reducing ozone, and (2) reduce future reporting to EPA related to non-attainment area status. The Maintenance Plan is a separate document distinct from this Attainment Plan.

The Maintenance Plan is to be adopted by the three regional agencies -- BAAQMD, MTC and ABAG. Following regional agencies' adoption, the Maintenance Plan will be submitted to the California Air Resources Board (ARB) for subsequent transmittal to EPA by November 15, 1993. To redesignate a non-attainment area from non-attainment to attainment, the EPA Regional Administrator (in the Bay Area's case, EPA Region IX) must find, in accordance with the CAA, Section 107(d)(3)(e), that the following criteria have been met:

- The Bay Area has attained the National Ambient Air Quality Standard;
- The State Implementation Plan has been fully approved by EPA under Section 110(k);
- The improvements in air quality are due to permanent and enforceable reductions in emissions resulting from implementation of the SIP, applicable federal air pollutant control regulations, and other permanent and enforceable reductions;
- All applicable requirements have been met as defined in Section 110 and Part D of the CAA; and
- The EPA has fully approved a maintenance plan, including a contingency plan, as defined in Section 175 of the CAA.

Environmental Review / California Environmental Quality Act (CEQA) Compliance

The Attainment Plan would not be subject to CEQA review because the Plan does not require the BAAQMD, MTC or ABAG to adopt or implement new programs in the region that could have a significant effect on the environment. The Attainment Plan simply relies on the continued implementation of regional planning and regulatory programs which have previously received environmental review under the Bay Area 1991 *Clean Air Plan (CAP) Environmental Impact Report (EIR)*. The CAP EIR addressed all the potential significant environmental impacts that might arise from the implementation of the CAP. The CAP, required under the California Clean Air Act,

requires similar but more stringent regulatory action than those proposed as ongoing regulatory action under this Attainment Plan.

The enhanced Inspection and Maintenance (I & M) program proposed for incorporation into the Attainment Plan as a contingency measure has not received environmental review. The I & M program would be promulgated by the California Legislature and adopted and implemented by the ARB or California Bureau of Automotive Repair (BAR). The ARB or BAR would be required under CEQA to provide environmental review and documentation of the enhanced I & M program prior to adoption of the program.

SECTION 2: HISTORY / CONTEXT

1982 Bay Area Air Quality Plan

With the Air Pollution Control Research and Technical Assistance Act, the federal government entered the field of air pollution control in 1955. This was followed in 1963 by legislation that granted federal authority to hold abatement conferences to exert pressure on polluters in specific areas of the nation. In 1963, the first Air Quality Act was passed. The implementation of the 1967 Air Quality Act did not result in substantial improvement in the nation's air quality.

The 1970 Clean Air Act, with substantially more regulatory authority than the previous acts, gave the EPA the authority to set National Ambient Air Quality Standards. In 1971, the EPA established national standards for six major criteria air pollutants, including ozone. The 1977 Clean Air Act Amendments (CAAA) were passed after many states failed to meet the five-year deadline for achieving the national standards. The new laws required each state to identify areas within its borders that did not meet national

primary standards (i.e., non-attainment areas) and devise a State Implementation Plan (SIP), subject to EPA approval, that would guarantee attainment no later than the end of 1987. The 1979 Bay Area Air Quality Plan (AQP), prepared in response to the 1977 CAAA, projected attainment of the national ozone standard by 1985. The 1979 Air Quality Plan was revised in 1982 under a CAA option allowing for an extension to a 1987 attainment target.

The 1977 CAAA did not specify what course of action would be undertaken by the EPA if areas failed to meet the 1987 attainment deadlines. After 1987, the Bay Area had still not attained the national ozone standard and was required to implement EPA interim policies. The passage of the federal CAAA in November 1990 specified planning requirements to be followed by non-attainment areas. This Attainment Plan has been prepared in response to requirements of the 1990 CAAA.

Relationship to State Standard and State Planning Requirements

The State of California has its own air quality standards and planning requirements that differ from those of the federal government. In regard to the ozone standard, the State standard of 0.09 ppm for a one-hour averaging time is more stringent than the national standard of 0.12 ppm.

In an effort to help air basins throughout California attain the State ozone standard, the 1988 California Clean Air Act (CCAA) was passed. The CCAA identified air quality goals, planning mechanisms, regulatory strategies and standards of progress. The goal of the CCAA is to attain the State ambient air quality standards by the "earliest practicable date." The 1991 *Bay Area Clean Air Plan* (CAP) was prepared to meet the planning requirements of the CCAA. The 1991 CAP includes extensions of some of the control measures found in the 1979 and 1982 federal plans and adds new control measures for stationary and transportation sources.

Among the similarities in the State and federal planning processes are the classifying of non-attainment areas, inventory preparation, identifying attainment dates and achieving specified annual emission reductions. Both the State and federal planning requirements apply designations to non-attainment areas. The State designates air basins as moderate, serious, severe, or extreme based on the highest

concentration of ozone monitored in the air basin. For State planning purposes, the Bay Area was originally designated as a "severe" ozone non-attainment area, based on the region's inability to demonstrate attainment of the (State) standard by 1997. A 1992 amendment to the State law resulted in a change to the "serious" category, based on measured ozone concentrations.

The federal CAA designates an area as marginal, moderate, serious, severe or extreme, based on the air basin's "design value" which is then correlated to an attainment date. Under the federal CAA, the Bay Area is designated as moderate and is therefore required to attain the national ozone standard by November 15, 1996. The federal CAA requires that moderate areas such as the Bay Area achieve a 15 percent reduction in VOC emissions over the six-year period from 1990 to 1996, excluding federal controls on vehicle emissions in place in 1990.

The State and federal Clean Air Acts both prescribe that areas projecting later attainment dates incorporate increasingly broader and more rigorous control strategies in their attainment plans. The CCAA requires that the Bay Area achieve an annual reduction in ozone precursor emissions of five percent (or implement all "feasible" measures) beginning in the year 1987. The Bay Area was unable to define a

control strategy that could be implemented to meet this level of emission reductions and therefore was

allowed under the CCAA to adopt "all feasible measures" and implement them expeditiously.

SECTION 3: 1990 CLEAN AIR ACT AMENDMENTS' OZONE NON-ATTAINMENT AREA PLANNING REQUIREMENTS

Non-Attainment Area Plan

The specific requirements for an area are based on the non-attainment classification. Based on the Bay Area's design value of 0.14 ppm, the Bay Area is classified as moderate for ozone and required to attain the national ozone standard by 1996 (i.e., six years after the enactment of the CAAA). Areas designated as moderate have specific ozone planning requirements which are addressed in Section 182(a) and (b) of the CAA. Nonattainment area plans are required to be submitted to the EPA Administrator by November 15, 1993.

In general, nonattainment area plans are required to provide for attainment of the national primary ozone ambient air quality standards. To meet this standard the CAA (Section 172(c)) requires non-attainment area plans to:

- Implement all Reasonably Available Control Technology (RACT) measures as expeditiously as practicable;
- Show Reasonable Further Progress (RFP);
- Submit comprehensive and accurate current baseline and periodic inventories of actual emissions from all sources;
- Identify and quantify the emissions from the construction and operation of major new or modified stationary sources and provide periodic updates of these sources;
- Require permits for the construction and operation of new or modified major stationary sources;
- Include enforceable emissions limitations, schedules and timetables to provide for attainment of the standard by 1996;
- Comply with Section 110(a)(2) requirements including:
 - operation of an ambient air quality monitoring network;
 - prohibition of emissions of air pollutants which would contribute significantly to non-attainment in, or interfere with maintenance by, any other State;

- assurances that adequate personnel, funding and authority are in place to implement the plan;
 - monitoring of emissions from stationary sources; and
 - performance of air quality modeling to predict the effect on ambient air quality of emissions,
- Provide for the implementation of specific contingency measures to be undertaken if the area fails to make reasonable further progress, or to attain the national ozone standard by the attainment date.

In addition to the general planning requirements discussed above, moderate areas are required to comply with all of the requirements of marginal areas, addressed in Section 182(a) of the CAA, in addition to specific requirements pertaining to moderate areas, as contained in Section 182(b) of the CAA. To comply with planning requirements for moderate areas, plans must:

- Show volatile organic compound (VOC) emission reductions of 15 percent from baseline emissions over the six-year period beginning with the enactment of the CAA in 1990 to the attainment target date in 1996, excluding federal controls on motor vehicle emissions in place in 1990.
- Require owners or operators of gasoline dispensing systems to install and operate a system for gasoline vapor recovery of emissions from the fueling of motor vehicles (*Vapor recovery has been in effect in the Bay Area since 1977*);
- Revise vehicle emission control inspection and maintenance (I & M) programs so that they are at least as stringent as those sanctioned by the EPA (*A "basic" I & M program is in effect in the Bay Area--for the oldest cars, an increase in the current \$75 repair cost waiver is necessary*); and
- Include new source review (NSR) offset requirements, with a ratio of total

emission reductions of volatile organic compounds to total increased emissions of at least 1.15 to 1. (The BAAQMD's

NSR offset requirement meets this standard.)

15 Percent Rate-of-Progress Plan

One provision for all non-attainment areas classified "moderate" and above is the planning requirement providing for Reasonable Further Progress (RFP). Under this requirement, the Bay Area must achieve a 15 percent reduction in emissions of volatile organic compounds over the six-year period beginning in 1990 and ending in 1996.

The 15 percent emission reductions are to be applied to a "baseline emission inventory" and are to go beyond federal motor vehicle and gasoline volatility controls and compensate for any growth in emissions after 1990. Details and calculations are provided in Section 9, "Rate-of-Progress Determination."

SECTION 4: EMISSIONS INVENTORY

The federal CAA requires the identification of two emissions inventories: (1) a 1990 Base Year Inventory and (2) a 1996 Projected Inventory. There are

specific federal requirements concerning how each of these two inventories are calculated (i.e., which controls can be credited).

1990 Base Year Inventory

An emissions inventory is an itemized list of emissions estimates for sources of air pollution in a given area for a specified time period. Present and future year inventories are critical components of air quality planning and modeling. The ultimate goal of the planning process is to identify and achieve an emissions pattern which does not result in violation of ambient standards.

The BAAQMD's emissions inventory is divided into stationary (e.g., refineries) and mobile sources (e.g., cars). Stationary sources are further subdivided into point (e.g., smokestack), area (e.g., use of consumer products and very small point sources) and biogenic (i.e., from the earth and its natural geological and biological sources) emissions. The actual 1987 -

1996 Bay Area volatile organic emissions by source category are summarized in Figure 1 and Table 2. The emissions are in tons per ozone season day. The preparation of the 1990 inventory is described in Appendix B, "Emissions Inventory". The current emissions in the BAAQMD's bank are added to the total inventory because they could be withdrawn and applied toward expansion of stationary sources.

The 1990 emissions are calculated using the actual or estimated activity (throughput) levels and the actual or estimated emissions factors. The emissions factors take into account the actual level of controls where applicable and are thus true "actual" emissions factors.

Figure 1 - Bay Area VOC Emission Inventory Projections 1987 - 1996

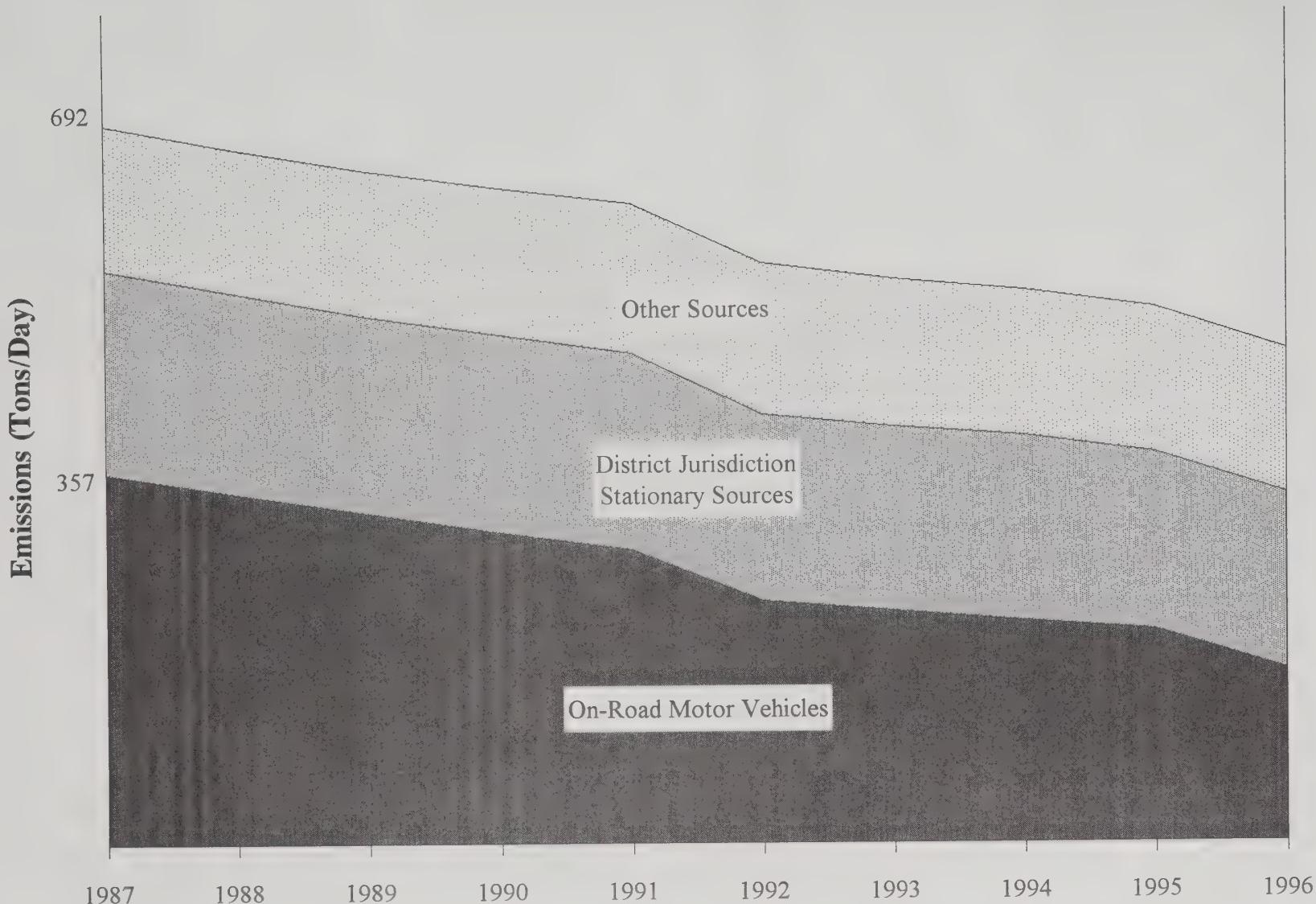


Table 2
Bay Area Baseline* Emission Inventory Projections: 1987 - 1996
Planning Inventory (Tons/Day)**

	Volatile Organic Compounds ¹									
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Base Year 1990										
Industrial/Commercial Processes/Facilities										
Petroleum Refining Facilities	19	20	17	17	17	17	16	16	16	16
Chemical Manufacturing Facilities	4	4	4	4	4	4	4	4	4	4
Other Industrial/Commercial Processes/Facilities	16	14	13	15	15	14	14	14	15	15
Petroleum Product/Solvent Evaporation										
Petroleum Refinery Evaporation	9	10	10	10	10	7	7	7	7	7
Fuels Distribution	21	21	22	22	22	21	21	21	21	21
Other Organic Compound Evaporation	121	117	117	115	114	109	108	108	100	99
Combustion - Stationary Sources										
Fuel Combustion	6	6	6	6	6	6	6	6	6	7
Burning of Waste Material	1	1	1	1	1	1	1	1	1	1
Subtotal (District Jurisdiction)	197	193	189	190	189	180	177	178	171	170
Combustion - Mobile Sources										
On-Road Motor Vehicles ²	357	338	319	300	282	233	223	213	204	165
Off-Highway Mobile Sources	59	60	61	63	64	65	67	66	66	63
Aircraft	17	17	18	18	18	18	18	19	19	19
Consumer Solvents and Other Sources	62	60	61	61	62	62	56	55	56	56
Grand Total	692	669	648	631	615	558	542	531	515	474

* Baseline projections are made assuming implementation of all control programs already adopted at federal, State, and regional levels as of December 31, 1992.

** Anthropogenic, or man-made, ozone precursors for summer operating day (does not include 9 tpd pre-1990 banking credit and 300 tpd from natural sources). Entries are rounded to nearest whole number, totals may not equal to sums of column entries.

¹ Volatile organic compounds (photochemically reactive organic compounds), VOC; excludes methane, ethane, PERC, other non-reactives.

² Based on ARB's EMFAC7F emission factors and BURDEN7F with MTC travel data.

1996 Projected Inventory

Baseline future year emissions for each source category are calculated from the base year (1990) emissions using the following equation:

$$EM_{FY} = EM_{BY} \times CF \times GF$$

where:

EM_{FY} is the forecasted emissions of an air pollutant for any future year,

EM_{BY} represents the base year emissions of the air pollutant (1990 is the base year in this forecast),

CF (Control Factor) is an indicator for the level of actual control achieved as a result of current federal, State and regional air quality regulations, and

GF (Growth Factor) is derived from best available data for the different source categories.

Control Factors

The impact of all adopted federal, State and regional air pollution control rules are included in emission forecasts by means of control factors. For an individual source category, a future year control factor CF is calculated by the equation:

$$CF_{FY} = \frac{E_{BY} - R}{E_{BY}}$$

where:

E_{BY} is the base year 1990 emissions for a category affected by one or more of the rules,

R is the sum of emission reductions from the applicable rules, and

CF (Control Factor) is unity (i.e., equal to 1.0) for 1990 and less than one for years after 1990, if there are reductions from the rules.

(or)

$$CF_{FY} = \frac{100 - CE_{FY}}{100 - CE_{BY}}$$

where:

CE_{BY} is the base year 1990 actual percent control efficiency (0 if none)

CE_{FY} is the future year actual percent control efficiency

The control factors in this inventory take into account all federal, State and regional air quality regulations adopted prior to December 31, 1992.

The emission factors and the percent control efficiencies used in the emission calculations are estimated "actuals" and therefore do not require adjustment to consider rule effectiveness. The 1996 emissions inventory is also included in Appendix B.

SECTION 5: ATTAINMENT DEMONSTRATION

The normal procedure for air quality planning would consist of the following steps:

- Select a base year for the analysis and a future year for plan implementation.
- Characterize the base year air quality (for example, calculate the design value) and the emission inventory for the base year.
- Project the inventory to the future year, based on population/activity forecasts.
- Use a model to predict future year air quality with the baseline inventory.
- Use the model to find a control-case inventory that shows attainment of the air quality standard.
- Define a set of control measures that, when implemented, should reduce the inventory to a level that results in attainment.
- Apply the model to the control strategy inventory and demonstrate attainment.

In the general case, the model could be any mathematical representation of the relationship between the emission inventory and ambient air quality.

The year 1990 is specified as the base year for this planning cycle for all ozone non-attainment areas in the nation. The future year for plan implementation may vary from region to region, depending on the severity of the ozone problem. The expected/required attainment date for "moderate" areas, such as the San Francisco Bay Area, is 1996. EPA's optimistic

interpretation of this Clean Air Act requirement is that a region should reach the attainment level emission inventory by 1994, so that 1994, 1995 and 1996 would produce the prerequisite three-year monitoring record that would result in attainment status by the end of 1996.

For this planning process in the San Francisco Bay Area, the circumstances are somewhat unusual. Though 1990 is specified (in the Clean Air Act Amendments) as the base year for analysis, the Bay Area was entering into a period of ozone attainment at that time. Nevertheless, the region had been designated a non-attainment area with respect to the National Ambient Air Quality Standard for ozone and classified as moderate with a design value of 0.14 ppm, based on monitoring data from the 1987 through 1989 time period. Therefore the region is subject to the planning and administrative requirements for moderate non-attainment areas. This Attainment Plan is submitted in partial fulfillment of those requirements.

Modeling analysis (described below) shows that the Bay Area will attain the standard when volatile organic emissions are reduced by 20 percent from the 1987 levels. Inventory projections show that this will occur by 1994 with control measures already implemented or adopted. Therefore, the region will attain the national standard with existing control programs; no new control strategy is necessary.

The most reliable attainment demonstration consists of air monitoring data showing that the air quality

standard is not violated. BAAQMD air monitoring records show that attainment conditions were achieved even earlier—during the 1990-1992 time

period. However, preparation and submittal of this plan is still required, pending formal redesignation of the region to attainment status.

EKMA Modeling

For this attainment demonstration, the Empirical Kinetic Modeling Approach (EKMA) was applied. This trajectory-based photochemical modeling procedure was developed several years ago, and is approved by EPA for use in moderate ozone non-attainment areas. Grid-based photochemical modeling with the Urban Airshed Model (UAM) is prescribed for "serious" and higher classifications. The UAM approach is also applicable for moderate areas, but it is immensely more complex, expensive and time-consuming. EKMA was used for this plan to enable the region to prepare an attainment demonstration for submittal by November 15, 1993.

The base year for the inventory and planning analysis is 1990, consistent with federal law and guidance. Earlier years were used for the modeling analysis, however, because (a) EPA guidance (Tikvart to Johnson/Region IV) recommends using days from the historical time period which resulted in the classification, and (b) there were not enough exceedance days in 1990 or subsequent years to apply the model as intended.

For the 1987-1989 time period, the Gilroy monitoring station showed the highest ozone value at 0.17 ppm. The largest number of exceedances of the standard (10 days) occurred at Livermore. Gilroy had seven days with exceedances. Those two stations were used, therefore, for the modeling analysis. Table 3 shows the twelve historical days selected for model-

ing analysis; seven for Livermore exceedances and five for Gilroy exceedances.

The EKMA model simulates the development of ozone in an air parcel that originates in a source area at 8 A.M., and then progresses under prevailing wind patterns to arrive at the appropriate place and time to coincide with the monitored exceedance. The trajectory of the parcel is derived from trajectory analysis, working back in time from the end point and using available wind data from nearby meteorological measurements. Appendix C provides more detail about the wind field analysis and the model application.

Each of the twelve days modeled, therefore, has a different starting point for the air parcel, and a different path to the monitoring site. The initial conditions are specified for the beginning of the model run, and the appropriate emissions are added into the simulated air parcel hour by hour along its specified trajectory. The model calculates the final ozone concentration, based on the initial pollutant mix, amount of added emissions, and the amount of ultraviolet radiation available for the geographic location as well as the sun's path for that day of the year.

Some of the modeling runs simulated ozone development with final concentrations near the observed (measured) values. Some under-predicted significantly and some over-predicted significantly. All of the results are shown in Appendix C, "EKMA Modeling and Analysis."

TABLE 3
EKMA MODELING
Sites and Days Modeled

Site	Date	Maximum Ozone (ppm)	Hour of Maximum
Gilroy	9/1/87	0.15	2:00 - 3:00 P.M.
Gilroy	9/29/87	0.17	2:00 - 3:00 P.M.
Gilroy	10/4/87	0.14	3:00 - 4:00 P.M.
Gilroy	9/4/88	0.14	3:00 - 4:00 P.M.
Gilroy	9/14/89	0.13	4:00 - 5:00 P.M.
Livermore	5/6/87	0.15	3:00 - 4:00 P.M.
Livermore	5/7/87	0.15	3:00 - 4:00 P.M.
Livermore	6/2/87	0.14	3:00 - 4:00 P.M.
Livermore	10/1/87	0.14	2:00 - 3:00 P.M.
Livermore	5/20/88	0.14	4:00 - 5:00 P.M.
Livermore	7/17/88	0.15	4:00 - 5:00 P.M.
Livermore	8/14/89	0.14	3:00 - 4:00 P.M.

Emission Reduction Target

The model also provides an estimate of the emission reductions needed to attain the standard under the particular circumstances modeled. For the twelve days modeled, the estimated volatile organic reductions, calculated according to EPA-recommended procedures, ranged from zero to 34 percent. The basic model run for each day used the best initial estimates as input data. In addition, eight more sensitivity runs were made for each day, to investigate the range of uncertainty from model inputs. The trajectories, inventory data, ozone predictions, and reduction estimates are provided in Appendix C, with a page of graphics for each of the twelve days analyzed.

The overall result of the EKMA analysis, conducted with EPA-recommended procedures, is a determination that a 20% reduction in volatile organic emissions (from 1987 levels) will result in attainment of the national ozone standard. Because the standard may be exceeded once per year, on average, at any given site, the three highest values for estimated emission reduction are set aside. The fourth highest value becomes the emission reduction target. For the Bay Area case, Livermore had the highest fourth-highest target, at 20% reduction.

If the best simulations from each day were chosen, then the results would have shown that only an 8% reduction in volatile organic emissions would be needed to produce attainment of the standard. In this usage the "best" simulation means the one with an ozone prediction closest to the actual measured value. This may be more technically justifiable, and would have been the procedure used if a grid-based photochemical model (UAM) were used with model verification and performance evaluation steps. In the EKMA guidance, however, if simulated ozone is anywhere within 30% of the observation, no more (or less) weight is given to results with simulated ozone near the measured data points. We must point out, however, that the 8% reduction estimate seems to be a better approximation of the Bay Area's air quality situation. By 1990, Bay Area volatile organic emissions were about 9% lower than they were in 1987 (the year of the modeled exceedance), and by 1990 the monitoring record began to show attainment of the national standard. Because of the uncertainties in modeling, inventory calculations, and meteorology, analysts do not rely upon such close agreement in the results. Nevertheless, the lower estimate (8% reduction) does agree with recent monitoring experience more than the 20% reduction estimate derived via standard EKMA procedures.

Control Measures Achieve Target

Again, the real world experience indicates that the current control strategy was adequate to attain the national standard. However, we have carried the 20% EKMA result through the emission inventory analysis steps to comply with EPA guidance and administrative requirements.

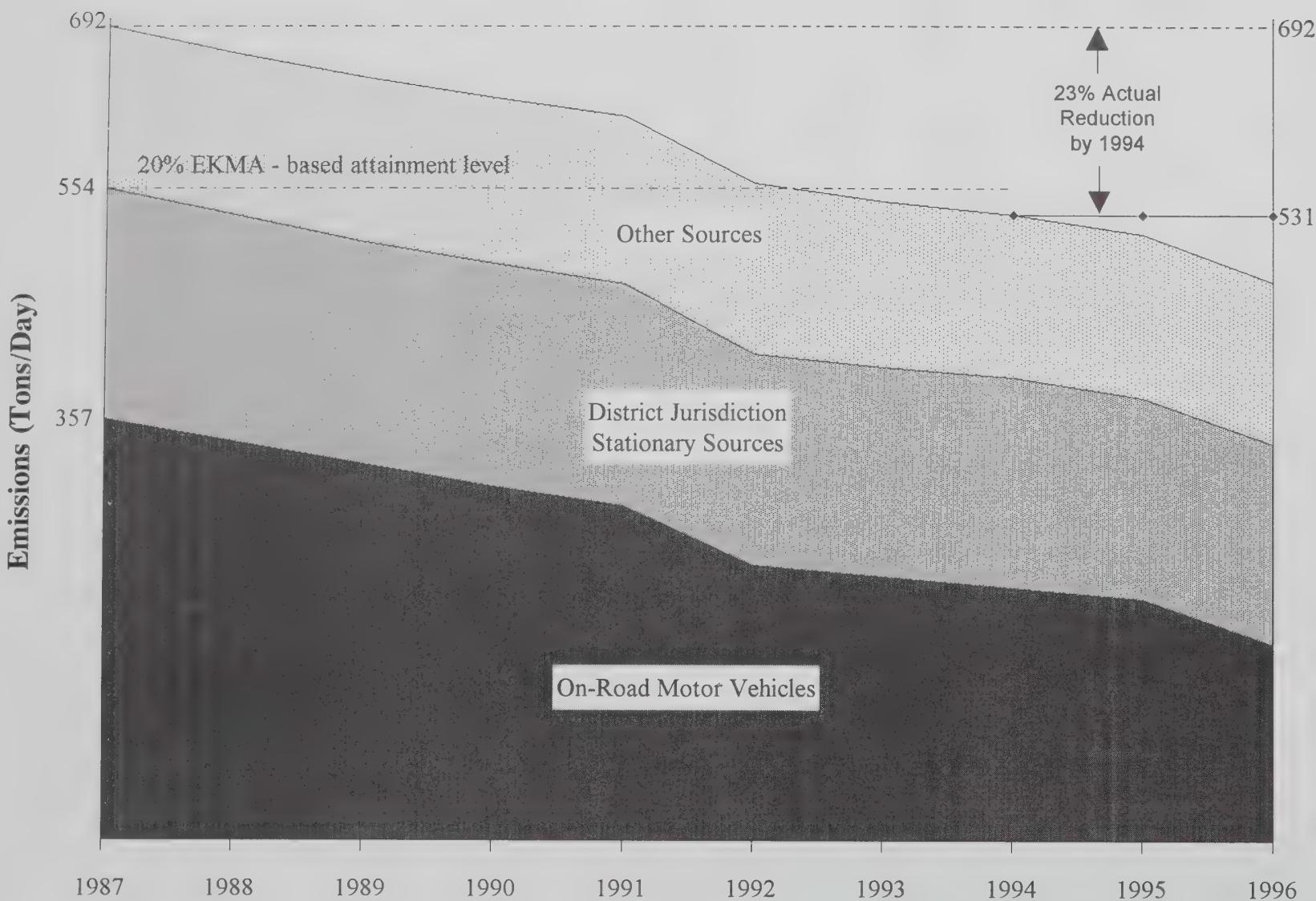
Figure 2 shows the Bay Area volatile organic inventory from 1987, the modeling base year, through 1996, the attainment deadline for moderate areas. This graph is consistent with the inventory numbers in Table 2 (see Section 4, "Emission Inventory," and Appendix B, "Emission Inventory"). The graph shows a consistent downward trend in the total emissions from 1987 through 1996, due to decreasing emissions from the motor vehicle sector of the inventory. Control efforts on other sources--industrial and small stationary sources--were effective in earlier years, but are now in the realm of diminishing returns. New technologies and new control techniques produce more modest emission reductions, and costs of implementation are increasing. The reductions achieved are adequate to compensate for growth due to population increases and economic expansion over the years.

Controls on motor vehicles, however, will continue to be effective through the next two decades. The motor vehicle emissions that now comprise about half of the volatile organics inventory will be reduced in the future by new vehicle technology, new control techniques, and new fuel requirements--implemented primarily by the California Air Resources Board. The Smog Check program, California's vehicle inspection and maintenance program, also achieves significant reductions, and its benefits should be enhanced when the program is improved in the future.

Figure 2 also shows a horizontal dashed line at 554 tons/day representing a 20% emission reduction from 692 tons per day, the 1987 inventory level. The graph also shows that the regional inventory will drop below that "attainment level" between 1992 and 1993, and thus produce attainment of the standard.

This analysis, therefore, demonstrates attainment of the standard even with the conservative (higher) 20% emission reduction target derived from the standard EKMA analysis. Therefore, no new control

Figure 2 - Bay Area VOC Emission Inventory Projections 1987 - 1996
EKMA - Based Attainment Estimate



measures would be required in this plan to achieve attainment of the national ozone standard.

SECTION 6: CONTINGENCY MEASURES

Section 172(c)(9) of the 1990 CAAA requires that an attainment plan include contingency provisions. These provisions would be implemented in the event that the Bay Area fails to: (1) make reasonable further progress⁸ toward attaining the national primary air quality standard for ozone by November 15, 1996, or (2) actually attain the standard by November 15, 1996. The specific contingency measure identified to meet this requirement is an "enhanced" inspection and maintenance (I & M) program for motor vehicles. The effectiveness of this proposed measure would be greater than four percent of the adjusted base year (1990) inventory (see Section 9, "Rate-of-Progress Determination"), exceeding EPA's three percent requirement.

Section 182(c)(3) of the 1990 CAAA requires an "enhanced" I & M program in areas classified as having "serious" "severe" or "extreme" air quality problems. "Moderate" areas are required to have a "basic" I & M program.

The Bay Area which is classified as "moderate" for ozone, would only be required to implement the "basic" I & M program, which is in place today. The

basic I & M program includes an idle test and visual inspection for tampering and defects to the emission control systems. In addition, the basic I & M program allows test and repairs to occur at the same location, with cost limits ranging from \$75 to \$300, depending on the model year.

Under EPA's guidelines, the enhanced I & M program would improve the testing of automobiles for emissions under loaded modes, during acceleration, and from evaporation. The program would separate State-contracted test stations from the repair stations and increase the repair cost limits to at least \$450.

In California, I & M programs are adopted by the State Legislature. The three regional agencies anticipate that the State Legislature will adopt a complying enhanced I & M program and that the Bay Area will elect to implement the program as needed to attain State air quality standards and/or as a contingency measure to maintain national standards. Table 4 shows the potential emission reductions from this measure as the difference between the enhanced program and the basic program.

TABLE 4
EMISSION REDUCTIONS FROM IMPLEMENTATION OF
AN ENHANCED I & M PROGRAM IN THE BAY AREA
(Tons/day)

Pollutant	Basic I & M	Enhanced I & M	Difference
VOC	28	52	24
CO	235	537	302
NOx	12	41	29

Source: California I/M Review Committee's Fourth Report to the Legislature--Evaluation of the California Smog Check Program and Recommendations for Program Improvements, February 16, 1993.

SECTION 7: CONFORMITY REQUIREMENTS

Section 176(c) of the 1990 Clean Air Act Amendments (CAAA) outline the "conformity" provisions of the Act. Federal actions are required to conform to the State Implementation Plan's (SIP's) purpose of

eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standard and achieving expeditious attainment of these standards. Federal actions are differentiated into

8 "Reasonable further progress" is the annual incremental reduction in pollution necessary for the Bay Area to attain the national primary air quality standard for ozone by November 15, 1996.

transportation-related actions by FHWA or FTA, and all other federal actions. The "transportation conformity" regulations govern the first set of actions, and the second set of actions will be addressed by the "general conformity" regulation to be issued later this year. This section provides a general overview of the transportation conformity requirements as conducted by MTC.

MTC will not approve any transportation plan, program, or project unless these activities conform to the purpose of the SIP. MTC's current conformity requirements include procedures from federal court orders relating to litigation over the 1982 Bay Area Air Quality Plan (the '82 SIP for the Bay Area) as well as procedures from the June 1991 Joint DOT/EPA "interim" guidance for transportation conformity.

Transportation plan refers to the MTC Regional Transportation Plan (RTP), which is the 20 year master plan for the region and which provides policies, actions, and financial projections to guide transportation investment decisions. Transportation program refers to the Transportation Improvement Program (TIP), which is a financially realistic set of highway and transit projects to be funded over the next seven years; the TIP includes all projects requiring federal funding, permits, or other approvals. A transportation project is any highway or transit project which is included in the RTP and TIP, requires federal funding or action, and is submitted to MTC for project review

and fund application approval. Detailed conformity criteria and procedures are described in MTC Resolution No. 2270 and are included in Appendix D, "Conformity Process."

On January 11, 1993, EPA published a Notice of Proposed Rule Making (NPRM) in the *Federal Register* which contained proposed "final" regulations for transportation conformity that will apply to both nonattainment and maintenance areas. The NPRM addresses two time periods: (1) the period up to the time when a revised SIP is approved by EPA, and (2) the period following EPA SIP approval. Once these regulations are adopted, they will replace the "interim" regulations described above. However, until these regulations are adopted, the current set of federal court-ordered conformity procedures and interim DOT/EPA procedures will govern the transportation conformity process for the Bay Area.

After EPA publishes the final federal regulations regarding transportation and general conformity, the co-lead agencies will prepare and submit a SIP revision establishing transportation and general conformity procedures for the Bay Area that comply with the new federal regulations, including the requirement for an emissions budget. The final federal regulations are expected to be published in October 1993 and are expected to require a conformity SIP revision within one year.

SECTION 8: TRANSPORTATION CONTROL MEASURES (TCMs)

The 1982 Air Quality Plan included twelve (12) Transportation Control Measures (TCMs); in addition, sixteen (16) new TCMs were added in February, 1990 under the provisions of the Contingency Plan, which required the adoption of new TCMs when the region failed to attain national air quality standards by 1987. These TCMs were updated and augmented in November 1991. Further, the 1982 Plan included carbon monoxide (CO) contingency measures for downtown Oakland and San Jose which were identified as CO "hotspots". These measures were subsequently implemented.

The 1982 Plan did not take emissions reduction credit for the original TCMs in its attainment demonstration, primarily because the emission reductions expected to be achieved from them were relatively small. The region did, however, commit to implementing these TCMs and regularly reported on their progress through 1987 as part of the annual Reasonable Further Progress (RFP) reports. Table 5 describes the proposed disposition of the original and contingency TCMs.

TCMs 1, 4, 7, 8, 10, 13, 15, 16, 17, 18, 27 and 28 are not included in this Plan because they have been fully implemented, and there are no additional actions needed to maintain their effectiveness. TCM 2 is proposed for deletion as moot since the relevant timeframe for implementation has elapsed and current commitments to improve transit service are contained in other TCMs. TCM 11 is proposed for deletion because the GasCAP program administered by the California Energy Commission was discontinued.

Several TCMs are recommended for consolidation. TCMs 9, 10 and 23 would be consolidated with TCM 5 which would include the following ridesharing activities: ridematching, training of Employer Transportation Coordinators, and general enhancement of employer ridesharing programs (formerly employer audits).

Notwithstanding the foregoing deletions and consolidations, all of the TCMs contained in the 1982 Plan and in the Contingency TCMs are carried forward in this Plan revision for continued implementation ex-

TABLE 5: PROPOSED CHANGES TO FEDERAL TRANSPORTATION CONTROL MEASURES

TCM		DESCRIPTION	PROPOSED CHANGED
From 1982 Air Quality Plan	TCM 1 (Complete)	Reaffirm commitment to 28% Transit Ridership Increase between 1978 and 1983.	10H Delete - applies to 1978-83 timeframe.
	TCM 2 (Delete)	Support post-1983 Improvements in the Operators' Five-Year Plans and, after consultation with the operators, adopt Ridership increase target for the period 1983 through 1987.	Delete - applies to 1983-1987 timeframe; See TCMs 3, 6, 17-19, and 21-22 for continuing commitments to improve public transit.
	TCM 3 (Merge)	Seek to expand and improve public transit beyond committed levels.	Merge with TCM 6 - seek capital and operating funds for transit improvements as defined in MTC's Regional Transportation Plan.
	TCM 4 (Complete)	High Occupancy Vehicle (HOV) lanes and ramp metering.	Delete - applies to HOV lane program completed prior to February 1990 (See TCM 20 below)
	TCM 5 (Revise)	Support RIDES efforts.	Revise - support regional ridesharing services and Employer Transportation Coordinator training, currently provided by RIDES.
	TCM 6 (Merge)	Continue efforts to obtain funding to support long-range transit improvements	Merge with TCM 3 - seek capital and operating funds for transit improvements as defined in MTC's Regional Transportation Plan.
	TCM 7 (Complete)	Preferential parking	Delete - original implementation goals have been met.
	TCM 8 (Complete)	Shared use Park and Ride lots	Delete - original implementation goals have been met.
	TCM 9 (Merge)	Expand commute alternatives program	Merge - part of activities currently being conducted by RIDES (TCM 5).
	TCM 10 (Complete)	Information program for local governments	Delete - implementation goals have been met.
Contingency Measures Added in 1990	TCM 11 (Delete)	Gasoline Conservation Awareness Program (GasCAP).	Delete - program no longer exists.
	TCM 12 (Complete)	Santa Clara County Commuter Transportation Program	Delete - activities generally included under other TCMs (TCM 5, TCM 19, TCM 20, etc.)
	TCM 13 (Complete)	Increase bridge tolls to \$1.00 on all bridges	Delete - Bridge toll increase in place; TCM completed.
	TCM 14	Bay Bridge surcharge of \$1.00.	Continue - needs Legislative approval.
	TCM 15 (Complete)	Increase state gas tax by 9 cents	Delete - gas tax increase enacted and in place; final increment to be added January 1994.
	TCM 16 (Complete)	Implement MTC Resolution 1876, revised	Delete - only included BART to Colma; construction of BART to Colma underway.
	TCM 17 (Complete)	Continue post-earthquake transit services	Complete - BART and ferry service improvements complete or fully funded.
	TCM 18 (Complete)	Sacramento-Bay Area Amtrak service.	Delete - three round trips initiated in December, 1990
	TCM 19	Upgrade CalTrain service	Continue.
	TCM 20	Regional HOV system plan.	Continue.
	TCM 21	Regional transit coordination.	Continue.
	TCM 22	Expand regional transit connection ticket distribution.	Continue.
	TCM 23 (Merge)	Employer audits	Consolidate with TCM 5 - part of regional ridesharing activities.
	TCM 24	Expand signal timing program to new cities.	Continue.
	TCM 25	Maintain existing signal timing programs.	Continue.
	TCM 26	Incident management on Bay Area freeways.	Continue.
	TCM 27 (Complete)	Update MTC guidance on development of local TSM Programs.	Delete - Guidance complete.
	TCM 28 (Complete)	Local TSM initiatives	Delete - Implementation goals have been met; additionally an employer-based Trip Reduction regulation is being implemented by Air District under State Clean Air Plan to meet State air quality standards.

cept to the extent that they have been fully implemented or are no longer applicable. For the sake of clarity, the remaining TCMs, as consolidated, are renumbered, starting with TCM 1, in this Plan revision. These renumbered TCMs are listed and de-

scribed in Table 6. This Plan revision does not attribute any emissions reductions targets to any of these TCMs, because this Plan revision demonstrates that attainment will be achieved even without these TCMs.

TABLE 6: REVISED FEDERAL TRANSPORTATION CONTROL MEASURES

	TCM	DESCRIPTION
TCM 1	Continue efforts to obtain funding to support transit improvements identified in MTC Regional Transportation Plan (formerly TCMs 3 and 6)	Seek capital and operating funds for transit improvements as defined in MTC Regional Transportation Plan
TCM 2	Upgrade CalTrain service (formerly TCM 19)	Increase train frequency to 66 trains a day.
TCM 3	Regional transit coordination (formerly TCM 21)	Coordinate transit operator fares and schedules (includes initiation of new regional transit services, regional transit telephone information number, and Translink on BART feeder buses).
TCM 4	Expand regional transit connection ticket distribution (formerly TCM 22)	Continue expansion of Regional Transit Connection and Regional Commuter Check programs to achieve \$15 million and \$5 million in annual sales, respectively, by 1996.
TCM 5	Regional HOV system plan (formerly TCM 20)	Complete 1995 HOV system consistent with the MTC 2005 HOV Lane Master Plan.
TCM 6a	Expand Signal Timing Programs (formerly TCM 24)	Upgrade and improve signal equipment and interconnect signals
TCM 6b	Maintain existing signal timing programs (formerly TCM 25)	Maintain existing signal timing programs (involves surveys and actual retiming to optimize traffic flow). Activity requires an ongoing, stable funding source.
TCM 7	Incident management on Bay Area freeways (formerly TCM 26)	Complete initial 45 mile segment of Caltrans' Traffic Operation System
TCM 8	Bay Bridge Surcharge of \$1.00 (formerly TCM 14)	Raise toll on Bay Bridge during peak period (Legislative approval required).
TCM 9	Support regional ridesharing efforts (formerly TCMs 5 - 9 - 10 - and 23)	Support various activities currently performed by RIDES: computerized ridematching services vanpool formation assistance Employer Transportation Coordinator (ETC) training enhancement of employer ridesharing programs and maintenance of employer ETC networks.

SECTION 9: RATE-OF-PROGRESS DETERMINATION

Section 182(b)(1) of the CAAA requires all ozone nonattainment areas classified as "moderate" or worse to submit a State Implementation Plan (SIP) revision by November 15, 1993, which describes, in part, how the area will achieve an actual emissions

reduction of at least 15 percent during the first six years after enactment of the 1990 CAAA. The 15 percent volatile organic compounds (VOC) emissions reduction required by November 15, 1996, is defined as "rate-of-progress."

1990 Adjusted Base Year Inventory

The CAAA specifies the emissions "baseline" from which the 15 percent reduction is calculated. This baseline value is termed the 1990 adjusted base year inventory. Section 182(b)(1)(B) defines baseline emissions (for purposes of calculating the 15 percent emissions reduction) as the total amount of actual emissions from all anthropogenic sources in the area. Section 182(b)(1)(D) excludes from the baseline the

emissions that would be eliminated by the Federal Motor Vehicle Control Program (FMVCP) regulations promulgated by January 1, 1990, and Reid Vapor Pressure (RVP) regulations (55 FR 23666, June 11, 1990), which require a maximum limit of 7.8 RVP during peak ozone season (for the Bay Area, late summer and autumn).

Calculation of the 1996 Target Inventory (Volatile Organics)

The 1996 target level of emissions, the rate-of-progress requirement, is calculated from an adjusted 1990 base year inventory. The 1990 base year inventory shown in Table 2 (see Section 4, "Emission Inventory") is adjusted to exclude the benefits from the FMVCP and federal RVP regulations. California Air Resources Board's estimates show 37.5 percent emission reduction between 1990 and 1996 due to FMVCP and RVP regulations, assuming 1990 activity level. The adjusted 1990 inventory for On-Road Motor Vehicles is therefore 112 tons per day (TPD) (300×0.375) lower than the base year 1990 inventory. There are no adjustments to Reasonably Available Control Technology (RACT) corrections required for the Bay Area.

The 1996 target level and the 15 percent emissions reductions required are calculated using the following five steps:

(1) 1990 Base Year Inventory (Table 2)

Point and Area Sources	250 TPD
On-Road Motor Vehicles	300 TPD
Other Mobile Sources	.81 TPD
TOTAL	631 TPD

(2) Adjusted 1990 Base Year Inventory

Point and Area Sources	250 TPD
On-Road Motor Vehicles, with FMVCP & RVP benefits (112 TPD) subtracted	188 TPD
Other Mobile Sources	.81 TPD
TOTAL	519 TPD

(3) 1996 Target Level (85 percent of Step 2)

$$519 \times 0.85 = \quad \quad \quad 441 \text{ TPD}$$

(4) 1996 Actual Baseline Emissions (Table 2)

Point and Area Sources	227 TPD
On-Road Motor Vehicles	165 TPD
Other Mobile Sources	.82 TPD
Sub-Total	474 TPD
Pre-1990 Banking	.9 TPD
TOTAL 1996	483 TPD

(5) Additional Reductions Needed by 1996 to Meet

15 Percent Requirement

$$483 - 441 = \quad \quad \quad 42 \text{ TPD}$$

Actual emissions will be reduced by 23 percent from 1990, but an additional reduction of 42 tons per day would be required to achieve the federal 15 percent target. The emissions and the target level are shown in Figure 3.

Section 5, "Attainment Demonstration," shows that the Bay Area already has attained the ozone standard, or will attain it by 1996 with no new control measures. Therefore the 15 percent rate-of-progress requirement should not apply to the Bay Area. The 15 percent requirement was intended to promote early and continuing emission reductions in areas that need those reductions to attain the standard.

The Appendices referenced herein are not included with this document. They are included in a separate document, "Attainment Plan Appendices," which can be obtained by calling the Bay Area Air Quality Management District, (415) 749-4900.

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Figure 3 - Bay Area VOC Emission Inventory Projections 1987 - 1996
EKMA - Based Attainment Estimate and EPA 15% Rate of Progress

